CLASS II PERMISSIVE CHANGE COMPLIANCE REPORT FOR PCS LICENSED TRANSMITTER

Test Report No.	**: E131R-018**
AGR No.	**: A131A-053**
Applicant	**: SOLiD, Inc.**
Address	**: 10,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400, Korea**
Manufacturer	**: SOLiD, Inc.**
Address	**: 10,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400, Korea**
Type of Equipment	**: RDU MODULE (800PS/900I/PA)**
FCC ID.	**: W6U80PS90IPAR**
Model Name	**: RDU 800PS+900I+PA_R**
Serial number	**: N/A**
Total page of Report	: **37 pages (including this page)**
Date of Incoming	**: January 03, 2013**
Date of issue	**: January 17, 2013**

SUMMARY

The equipment complies with the regulation; **FCC Part 24 Subpart D and Part 90 Subpart I.**

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Prepared by: Ki-Hong, Nam / Senior Engineer, ONETECH Corp.

Approved by: Y. K. Kwon / Exe. Managing Director, ONETECH Corp.

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EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

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1. VERIFICATION OF COMPLIANCE

APPLICANT	: SOLiD, Inc.
ADDRESS	: 10,9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400, Korea
CONTACT PERSON	: Mr. Kangyeob, Bae / Director
TELEPHONE NO	: +82-31-627-6292
FCC ID	: W6U80PS90IPAR
MODEL NAME	: RDU 800PS+900I+PA_R
SERIAL NUMBER	: N/A
DATE	: January 17, 2013

EQUIPMENT CLASS	PCB - PCS Licensed Transmitter
EQUIPMENT DESCRIPTION	RDU MODULE (800PS/900I/PA)
THIS REPORT CONCERNS	Class II Permissive Change
MEASUREMENT PROCEDURES	ANSI C63.4: 2009, EIA/TAI-603B
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	PART 24 subpart D and PART 90 Subpart I
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	No
FINAL TEST WAS CONDUCTED ON	3 METER(S) OPEN AREA TEST SITE

-. The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.

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2. TEST SUMMARY

2.1 Test items and results

SECTION	TEST ITEMS	RESULTS
2.1046(a), 24.132, 90.205	RF Power Output at Antenna Terminals	Met the Limit / PASS
2.1047	Modulation Characteristics	PASS (See Note 1)
2.1049, 24.131 , 90.210	Occupied Bandwidth, Bandwidth Limitation	Met the Limit / PASS
2.1049	Band Edge	Met the Limit / PASS
2.1051, 24.133, 90.210	Spurious Emissions at Antenna Terminals	Met the Limit / PASS
2.1053, 24.133, 90.210	Field strength of Spurious Radiation	PASS (See Note 3)
2.1055, 24.135, 90.213	Frequency Stability with Temperature variation	PASS (See Note 3)
2.1055, 24.135, 90.213	Frequency stability with primary voltage variation	PASS (See Note 3)
2.1093	RF Exposure	See Note 2

Note1: The Equipment under Test (EUT) is a signal booster which reproduces the modulated input signal, which was received by optic cable, so the EUT meets the requirement.

Note2: End Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance, because the applicant does not provide an antenna for sale with the EUT.

Note3: This test was not performed, because the EUT does not have any electrical schematic change, but emission designator was added on the device with the FCC ID: W6U80PS90IPAR already granted on June 28th, 2012 and this test shall be performed with CW signal.

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Related Submittal(s) / Grant(s)

Class II Permissive Change

Following modification(s) is/are made on the product, which was already granted on June 28th, 2012.

	Before	After
Emission Designator	GXW (iDEN), F8W (SMR), D7W (LTE)	GXW (iDEN), F8W (SMR), D7W (LTE), F9W (CDMA, 1xEVDO)
Operating Frequency	(851 ~ 869) MHz	(851 ~ 869) MHz
Note: Any electrical/electronic schematic change was not made on the product.		

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2.4 Purpose of the test

To determine whether the equipment under test fulfills the requirements of the regulation stated in section 2.1, because.

2.5 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2009 & EIA/TIA-603-C: 2004 and was performed at a distance of 3 m from EUT to the antenna.

2.6 Test Facility

The open area test site and conducted measurement facilities are located on at 307-51 Daessangryung-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. Description details of test facilities were submitted to the Commission on August 21, 2008. (Registration Number: 340658)

301-14, Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do, 464-862, Korea. The Onetech Corp. has been accredited as a Conformity Assessment Body (CAB) with designation number KR0013.

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3. GENERAL INFORMATION

3.1 Product Description

The SOLiD, Inc., Model RDU 800PS+900I+PA_R (referred to as the EUT in this report) is a RDU MODULE (800PS/900I/PA) that shall be plugged in ROU (Remote Optic Unit). The ROU can be equipped with up to 3 RDUs (Remote Drive Unit), a RPSU (Remote Power Supply Unit), a RCPU (Remote Central Processor Unit), a R-Optic (Remote Optic), a SIU (System Interface Unit) and a Multiplexer. The System, SMDR-NH124 consists of ROU, BIU (BTS Interface Unit), ODU (Optic Distribution Unit), and OEU (Optic Expansion Unit). Except for ROU, the RF output ports of other units are connected to coaxial cable each other. ROU receives TX optical signals from ODU or OEU and converts them into RF signals. The converted RF signals are amplified through High Power Amp in a corresponding RDU, combined with multiplexer module and then radiated to the antenna port.

When receiving RX signals through the antenna port, this unit filters out-of-band signals in a corresponding RDU and sends the results to Remote Optic Module to make electronic-optical conversion of them. After converted, the signals are sent to an upper device of ODU or OEU. ROU can be equipped with up to three RDUs (Remote Drive Unit) and the module is composed of maximal Dual Band, but this report only covers RDU 800PS+900I+PA, FCC ID: W6U80PS90IPAR and other modules shall be issued with other test report number. The product specification described herein was obtained from product data sheet or user's manual.

DEVICE TYPE		RDU MODULE (800PS/900I/PA)
LIST OF EACH OSC. or CRY. FREQ.(FREQ.>=1 MHz)		14.74 MHz
EMISSION DESIGNATOR		GXW(iDEN), F8W(SMR), D7W(LTE), F9W (CDMA, 1xEVDO)
OPERATING FREQUENCY	800PS	851 MHz ~ 869 MHz
	900I	935 MHz ~ 941 MHz
	Paging	929 MHz ~ 930 MHz
RF OUTPUT POWER		30 dBm
CHANNEL SEPARATION		25 kHz(iDEN), 12.5 kHz(SMR), 5 MHz(LTE), 1.25MHz(CDMA, 1xEVDO)
DC VOLTAGE & CURRENT INTO FINAL AMPLIFIER		DC 27 V, 2 A
ELECTRICAL RATING		AC 120 V, 0.97 A, DC - 48 V
OPERATING TEMPERATURE		-10 °C ~ 50 °C

3.2 Alternative type(s)/model(s); also covered by this test report.

-. None

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3.3 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	FCC ID	Description	Connected to
RDU 800PS+900I+PA_R	SOLiD, Inc.	W6U80PS90IPAR	EUT	-
SMJ100A	Rohde & Schwarz	N/A	Vector Signal Generator	EUT

3.4 Mode of operation during the test

The EUT was received signal form signal generator and then each modulation was configured for maximum signal gain and bandwidth. The EUT was operated in a manner representative of the typical usage of the equipment. During all testing, system components were manipulated within the confines of typical usage to maximize each emission. The applicant does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports on the EUT for radiated spurious emission testing.

4. EUT MODIFICATIONS

-. None

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5. RF POWER OUTPUT at ANTENNA TERMINAL

5.1 Operating environment

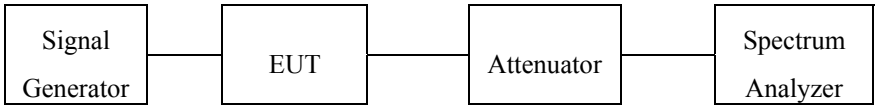
Temperature : 20 °C

Relative humidity : 47 %R.H.

5.2 Test set-up

The RF signal from the signal generator(s) was injected to the EUT by cable. The amplified RF signal at the output of the EUT was connected to the power meter or spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

RF output power was measured by channel power measurement function of the spectrum analyzer.



5.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	E4432B	HP	Signal Generator	US38440950	Jun. 01, 2012 (1Y)
■ -	SMJ100A	R/S	Signal Generator	101038	Feb. 02, 2012 (1Y)
■ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 12, 2012 (1Y)
□ -	8564E	HP	Spectrum Analyzer	3650A00756	Apr. 04, 2012 (1Y)
■ -	FSV30	R/S	Spectrum Analyzer	101372	May. 31, 2012 (1Y)
■ -	SA-26B-6	VENTRIX	Attenuator	N/A	Dec. 06, 2012 (1Y)

All test equipment used is calibrated on a regular basis.

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5.4 Test data

-. Test Date : January 08, 2013

-. Test Result : Pass

Modulation	Channel	Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)
CDMA	Low	852.250 0	-14.90	30.00	1.00	100.00
	Middle	860.000 0	-14.80	30.00		
	High	867.750 0	-14.90	30.00		
1xEVDO	Low	852.250 0	-14.70	30.00	1.00	
	Middle	860.000 0	-14.80	30.00		
	High	867.750 0	-14.80	30.00		

Tested by: Ki-Hong, Nam / Project Engineer

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6. OCCUPIED BANDWIDTH

6.1 Operating environment

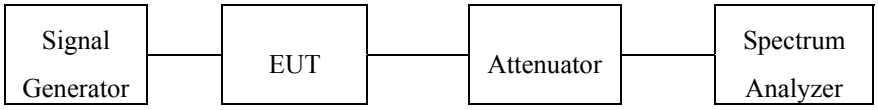
Temperature : 20 °C

Relative humidity : 47 %R.H.

6.2 Test set-up

The RF signal from the signal generator(s) was injected to the EUT by cable. The amplified RF signal at the output of the EUT was connected to the power meter or spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

For the testing, the RBW was set to 1 % to 3 % of the -26 dB bandwidth. The VBW is set to 3 times the RBW and sweep time is coupled.



6.3 Test equipment used

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□ -	8564E	HP	Spectrum Analyzer	3650A00756	Apr. 04, 2012 (1Y)
■ -	FSV30	R/S	Spectrum Analyzer	101372	May. 31, 2012 (1Y)
■ -	SA-26B-6	VENTRIX	Attenuator	N/A	Dec. 06, 2012 (1Y)

All test equipment used is calibrated on a regular basis.

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6.4 Test data

-. Test Date : January 08, 2013

-. Test Result : Pass

Modulation	Channel	26 dB Bandwidth (kHz)	99 % Occupied Bandwidth (kHz)
CDMA	Low	1 534.00	1 316.93
	Middle	1 526.80	1 316.93
	High	1 519.50	1 316.93
1xEVDO	Low	1 534.00	1 316.93
	Middle	1 526.80	1 316.93
	High	1 519.50	1 316.93

Remark: According to above result, the carrier frequency shall be within the frequency block edges.

Tested by: Ki-Hong, Nam / Project Engineer

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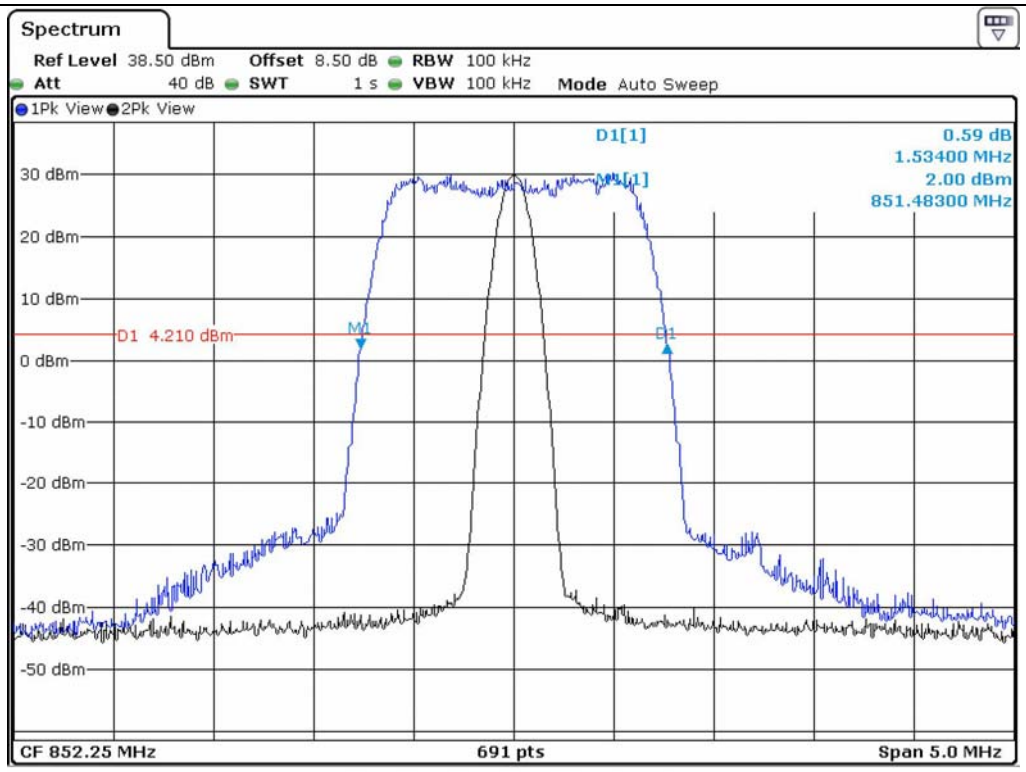
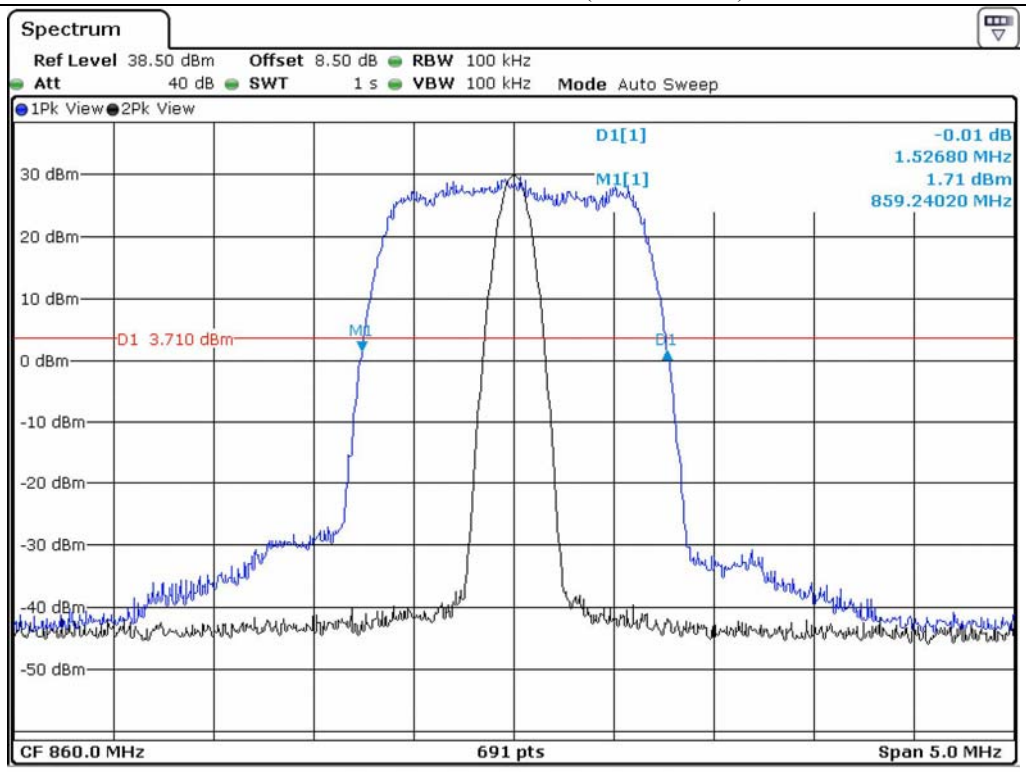


CDMA – 26 dB Bandwidth (Low Channel)



CDMA – 26 dB Bandwidth (Middle Channel)

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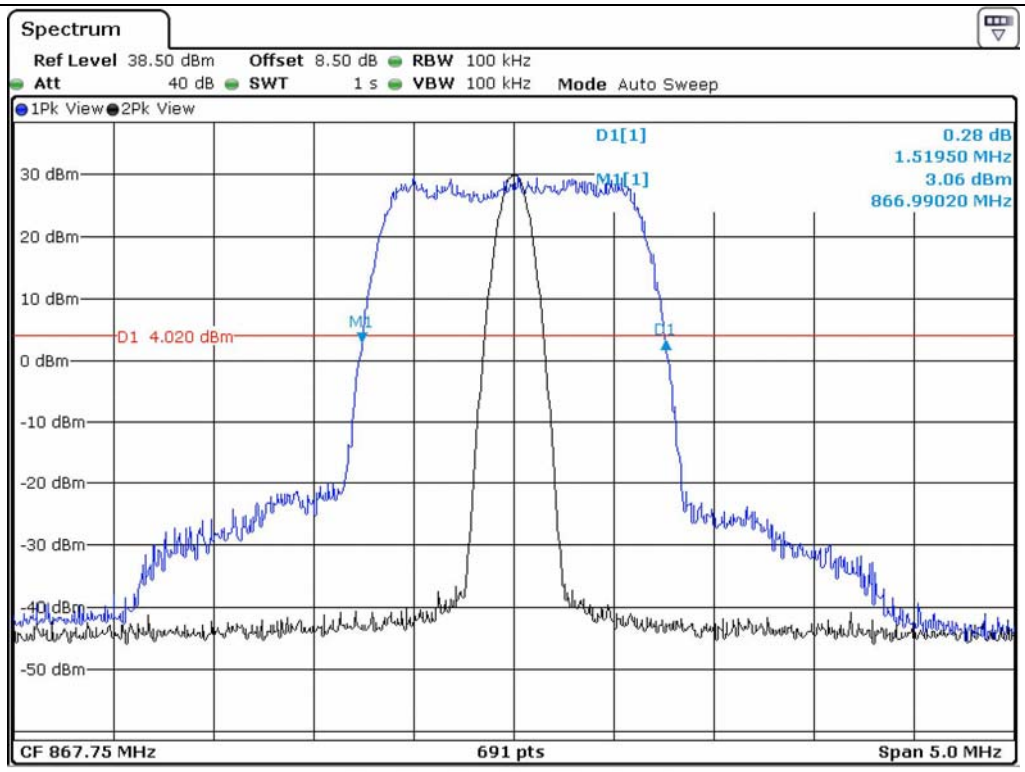

CDMA – 26 dB Bandwidth (High Channel)

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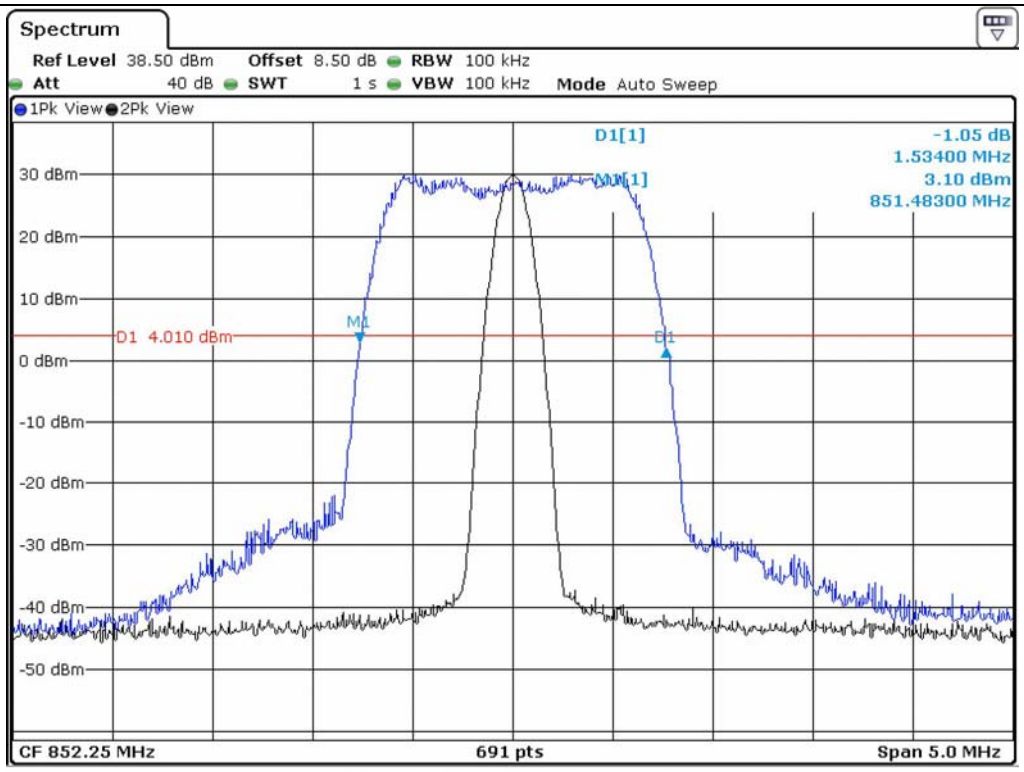
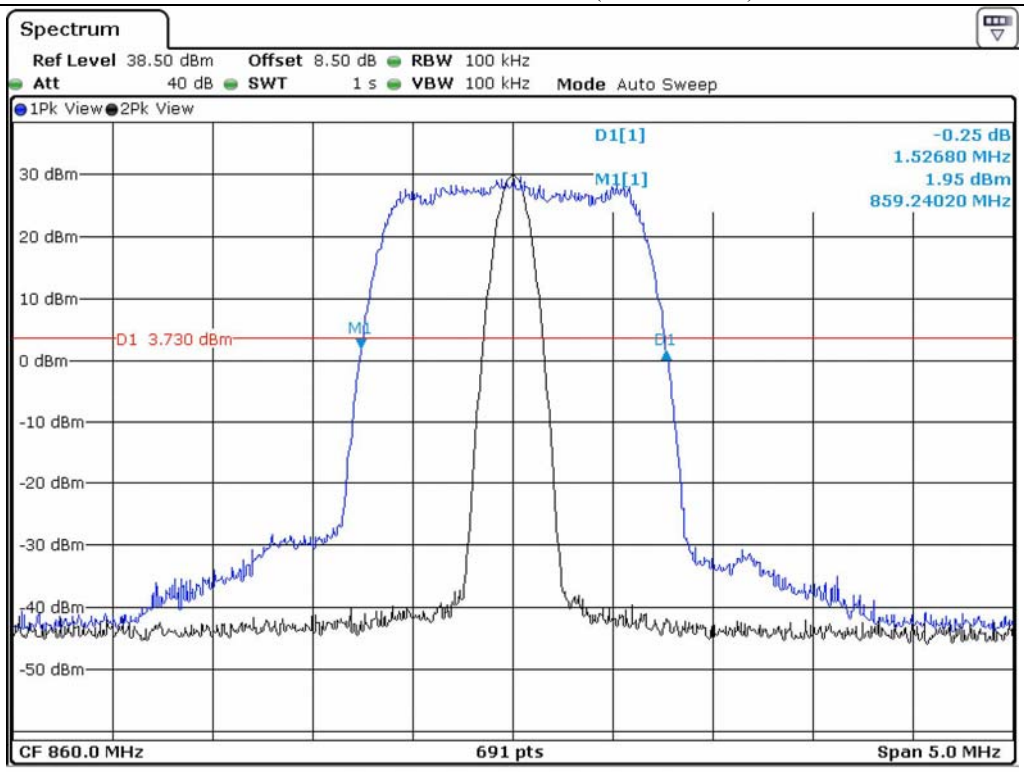


1xEVDO – 26 dB Bandwidth (Low Channel)



1xEVDO – 26 dB Bandwidth (Middle Channel)

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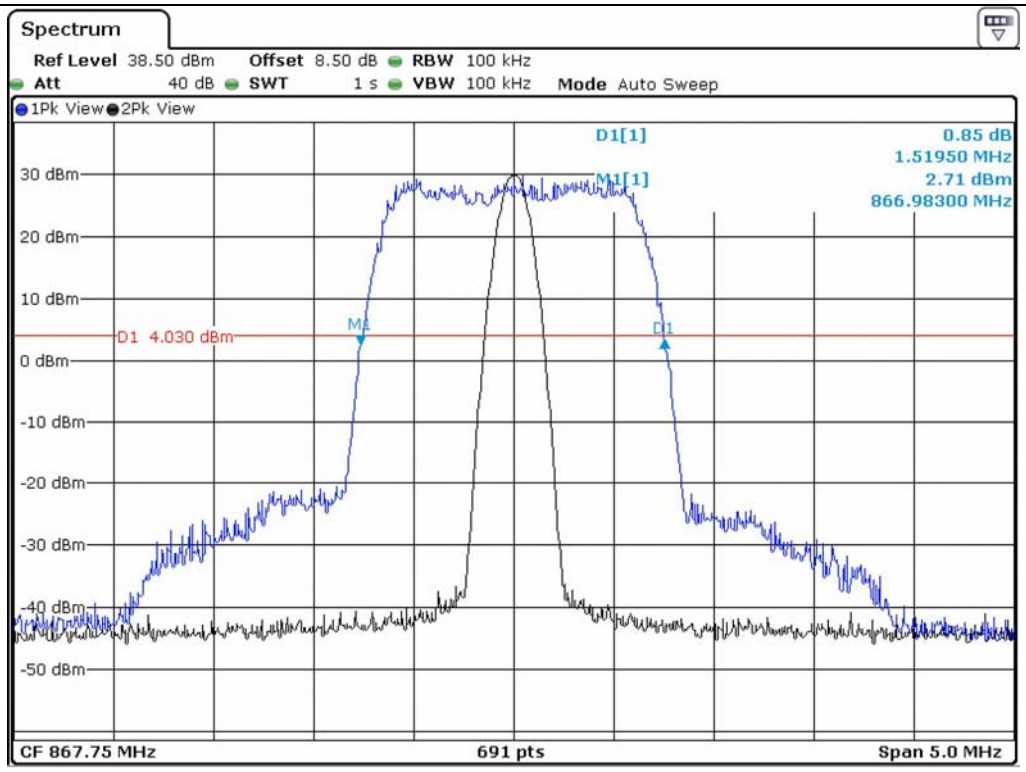

1xEVDO – 26 dB Bandwidth (High Channel)

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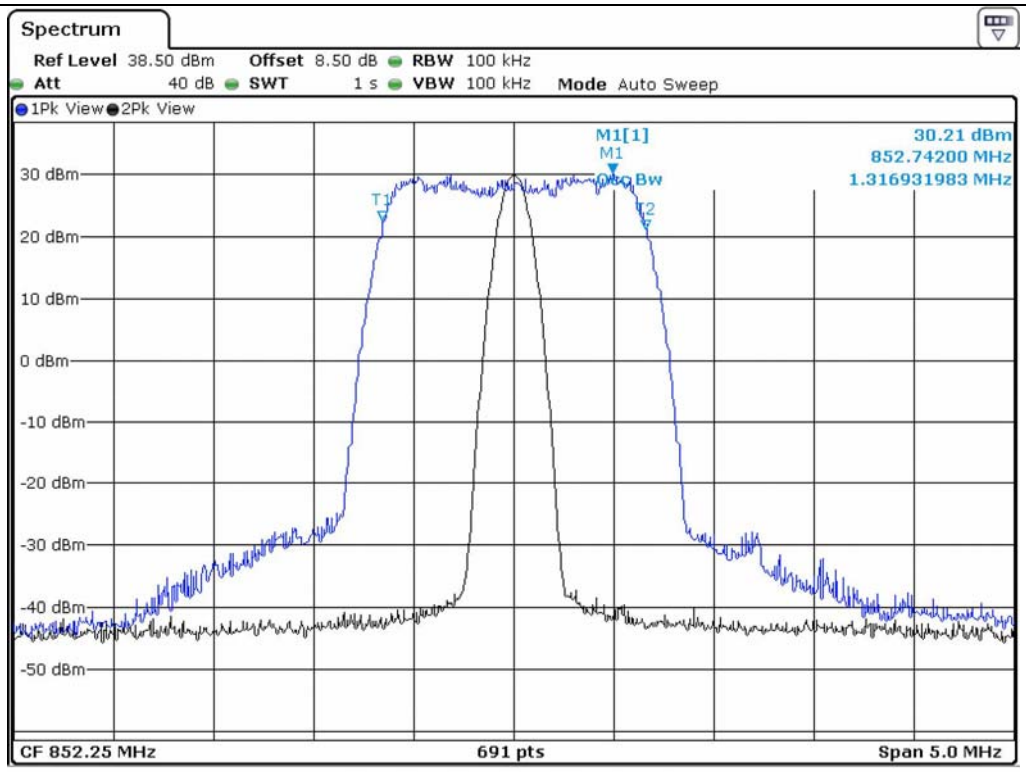
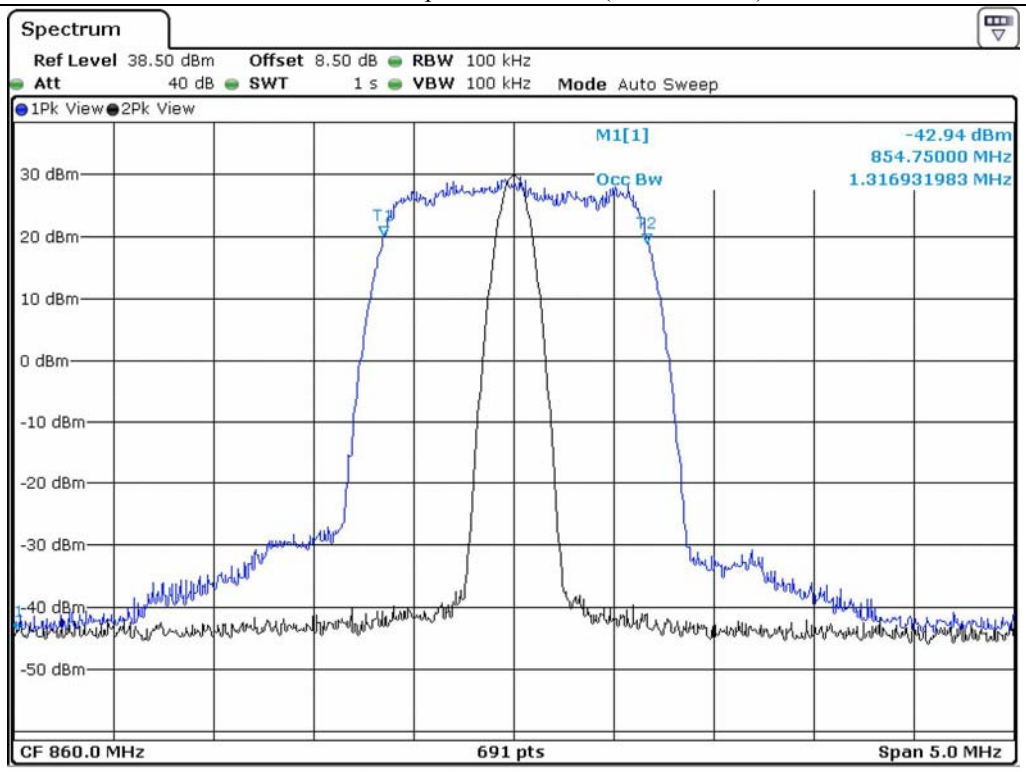


CDMA – Occupied Bandwidth (Low Channel)



CDMA – Occupied Bandwidth (Middle Channel)

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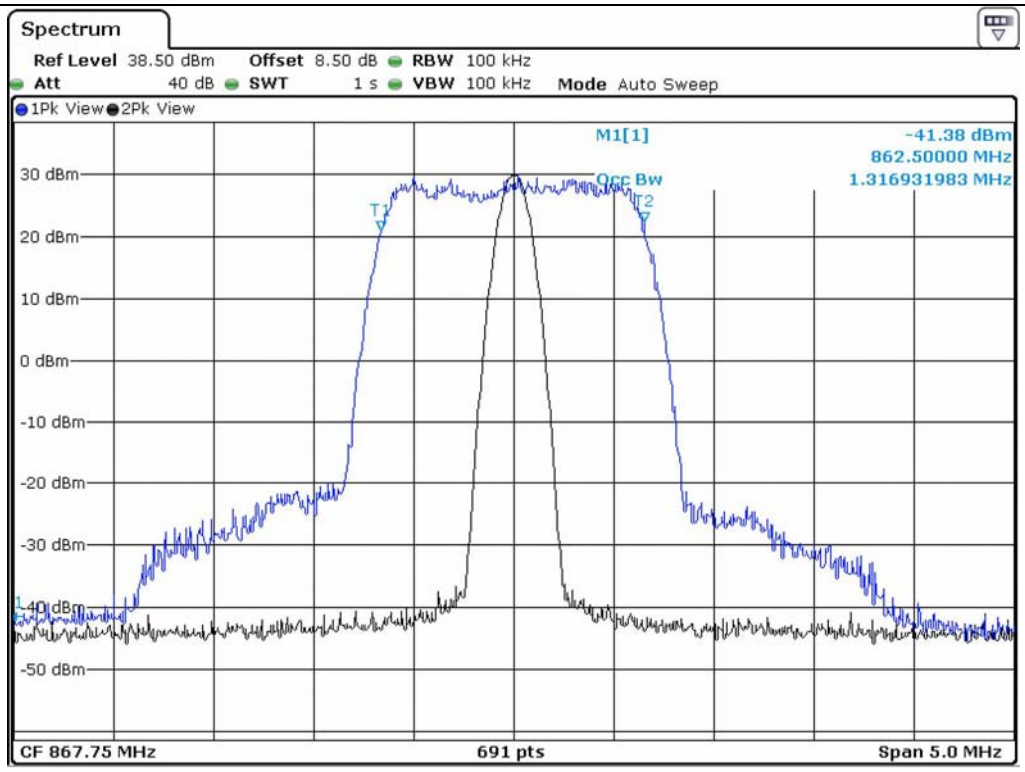

CDMA – Occupied Bandwidth (High Channel)

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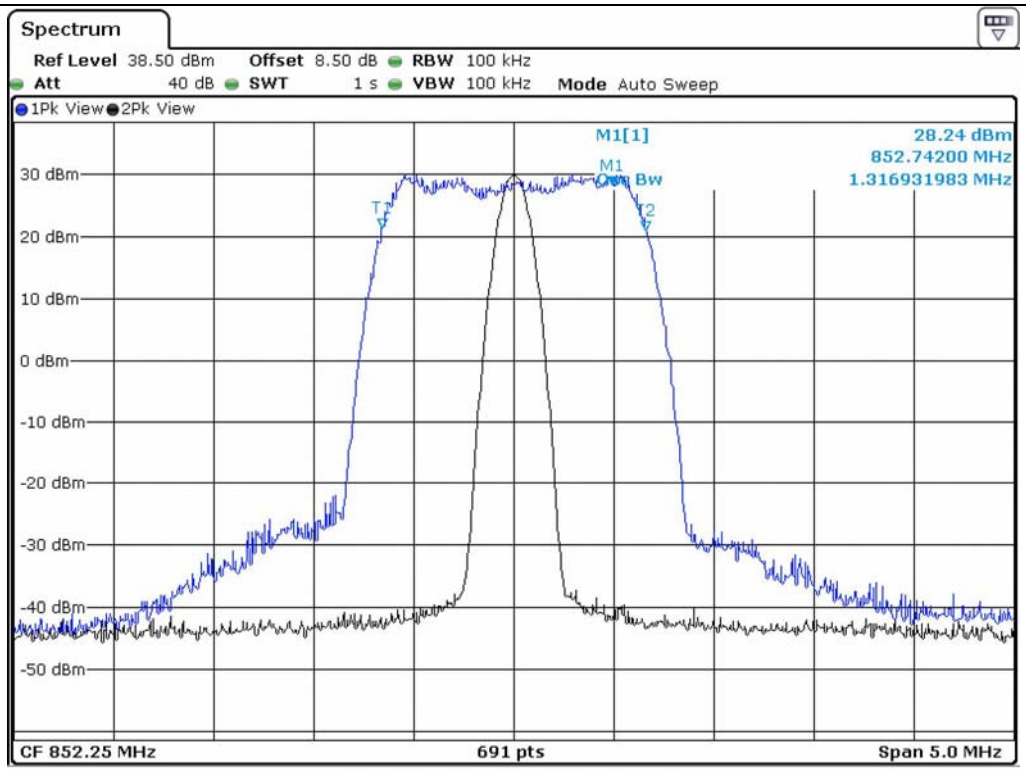
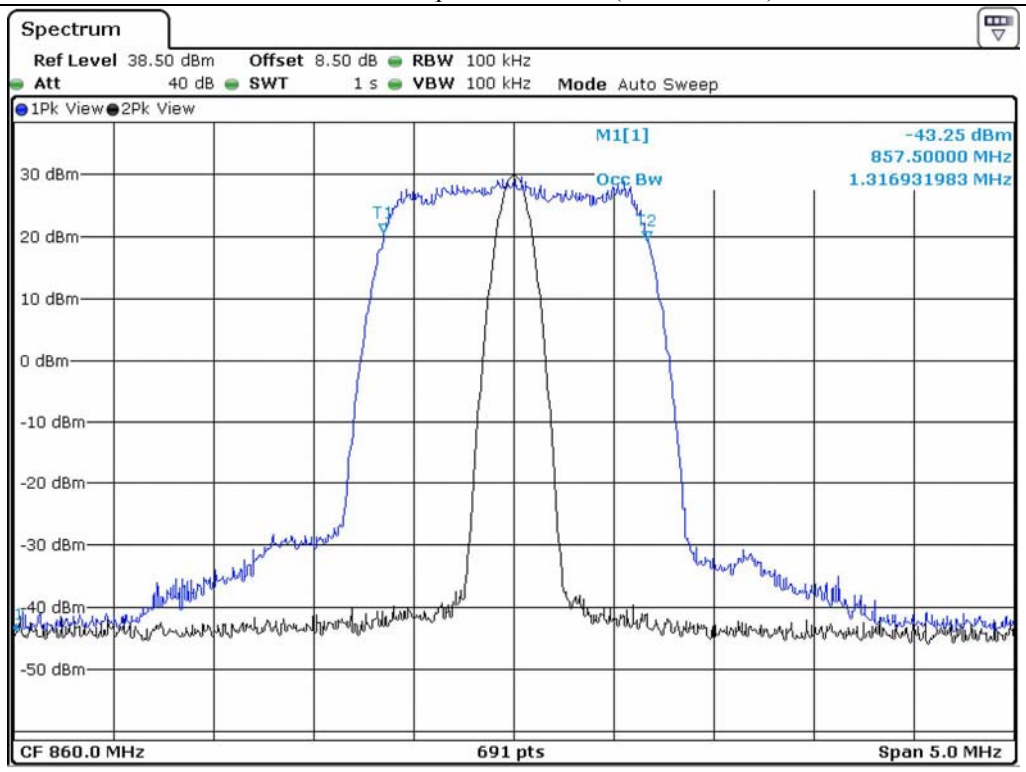


1xEVDO – Occupied Bandwidth (Low Channel)



1xEVDO – Occupied Bandwidth (Middle Channel)

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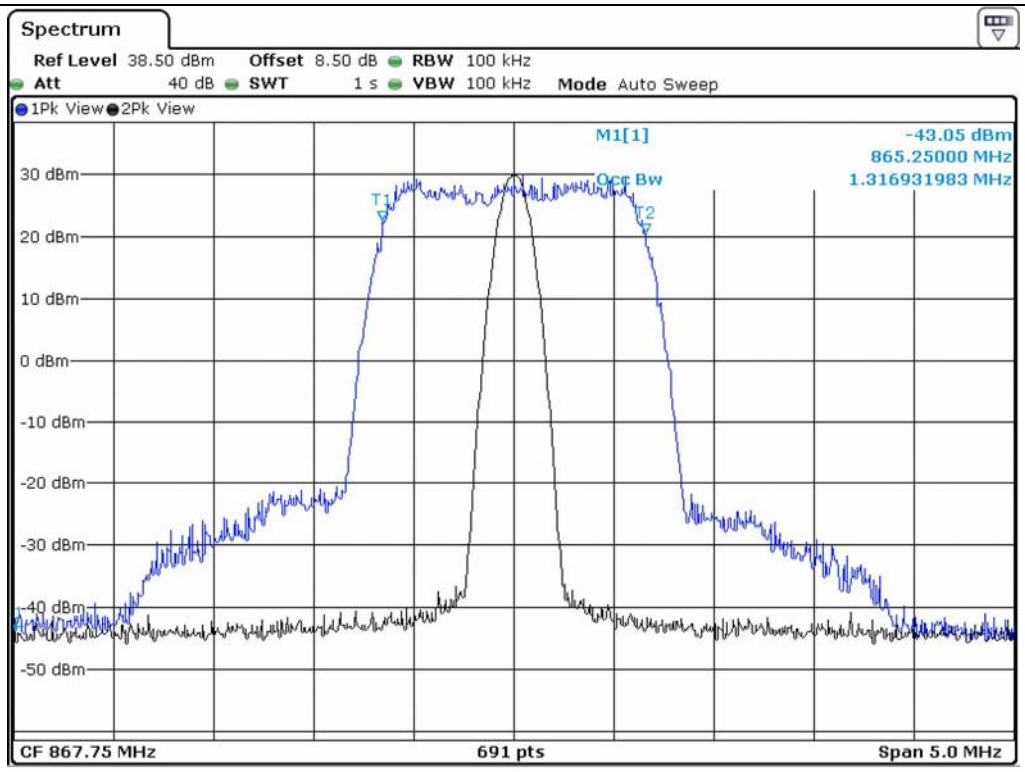

1xEVDO – Occupied Bandwidth (High Channel)

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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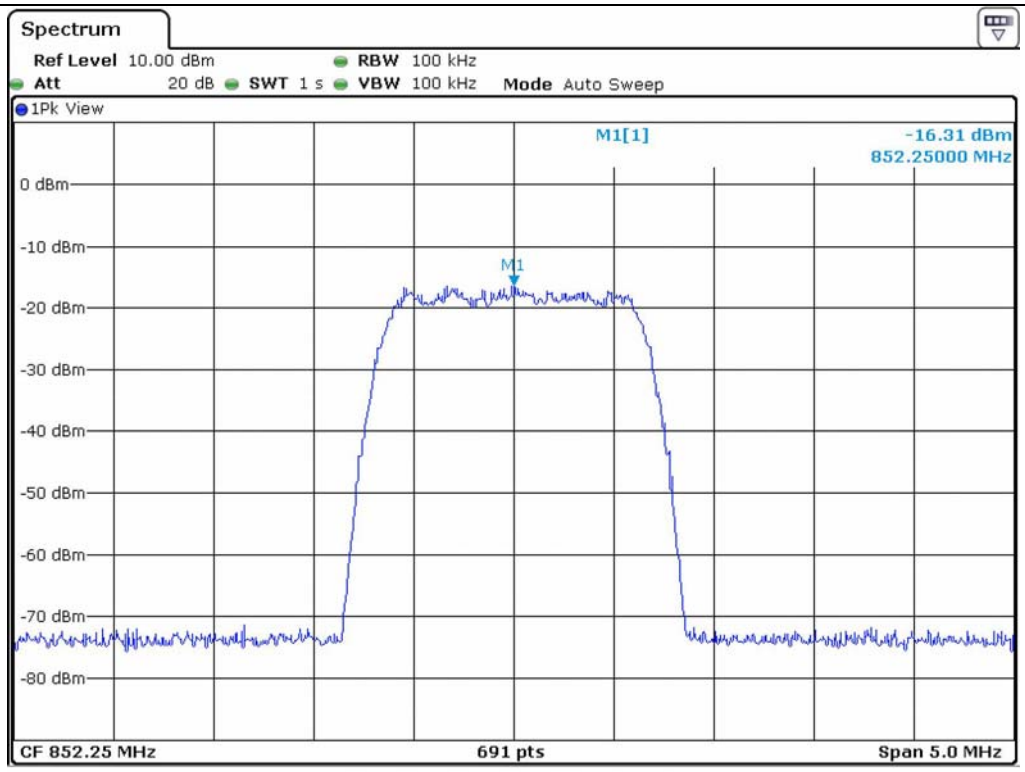
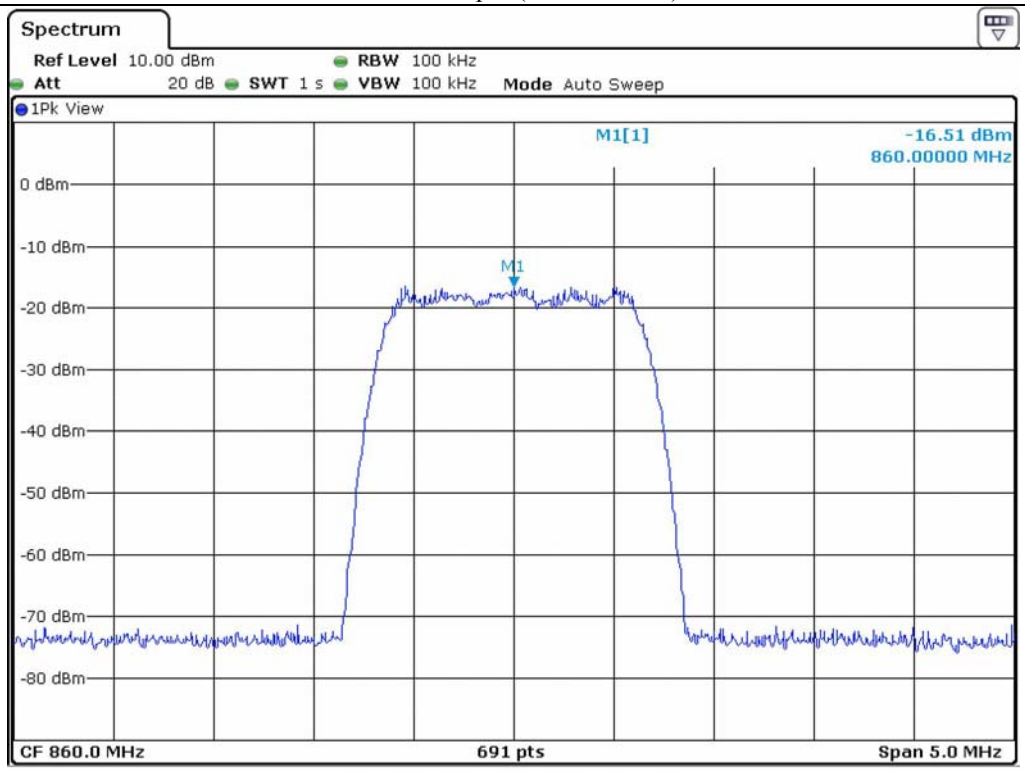
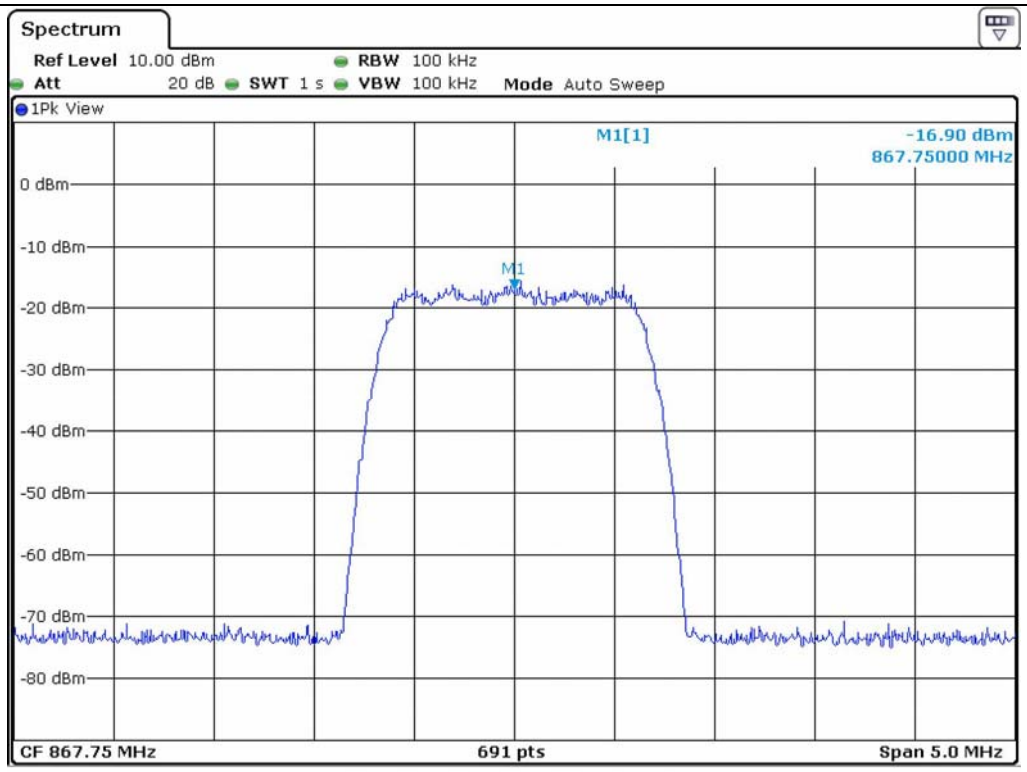


CDMA – Input (Low Channel)



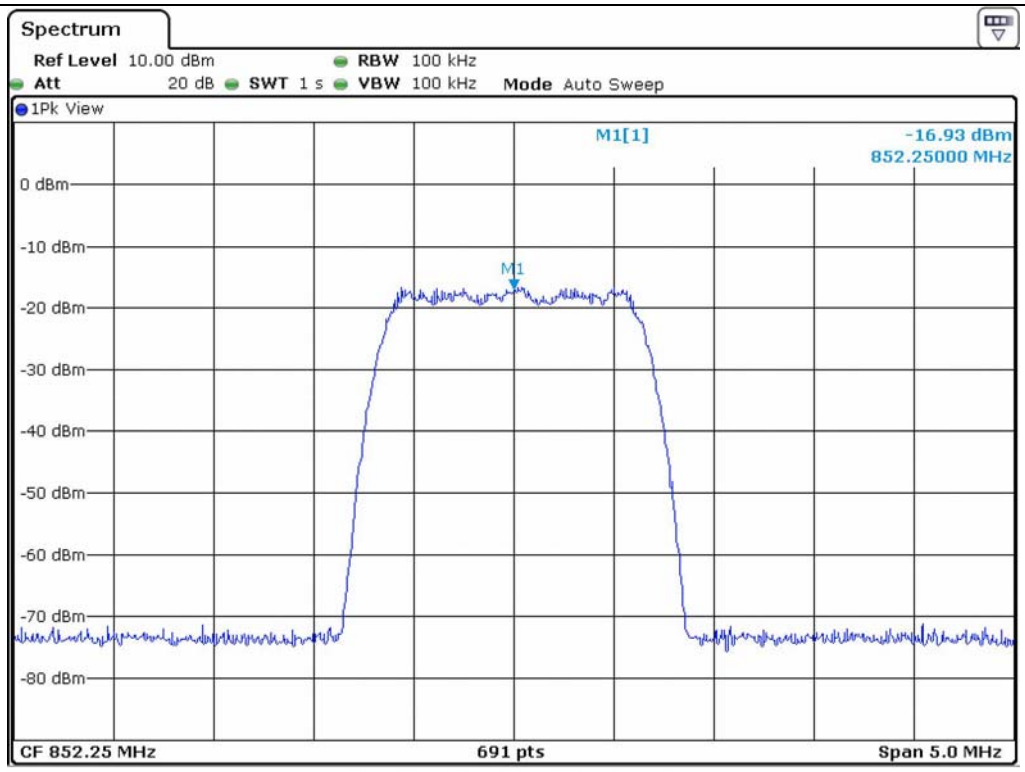
CDMA – Input (Middle Channel)

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

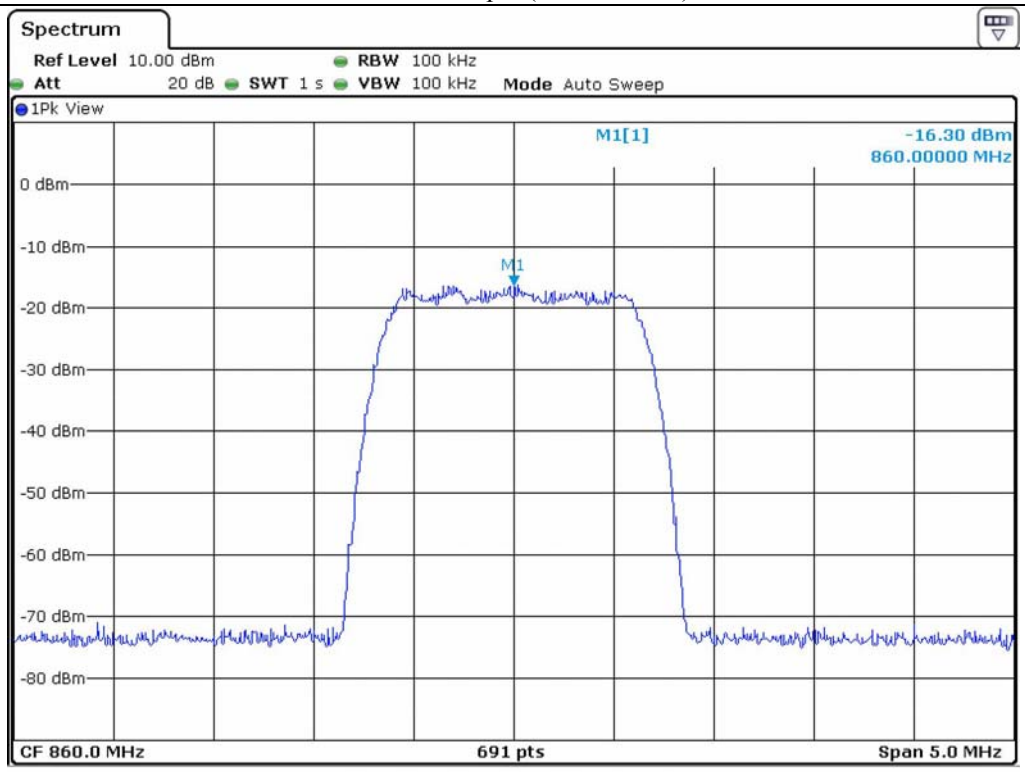


CDMA – Input (High Channel)

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



1xEVDO – Input (Low Channel)



1xEVDO – Input (Middle Channel)

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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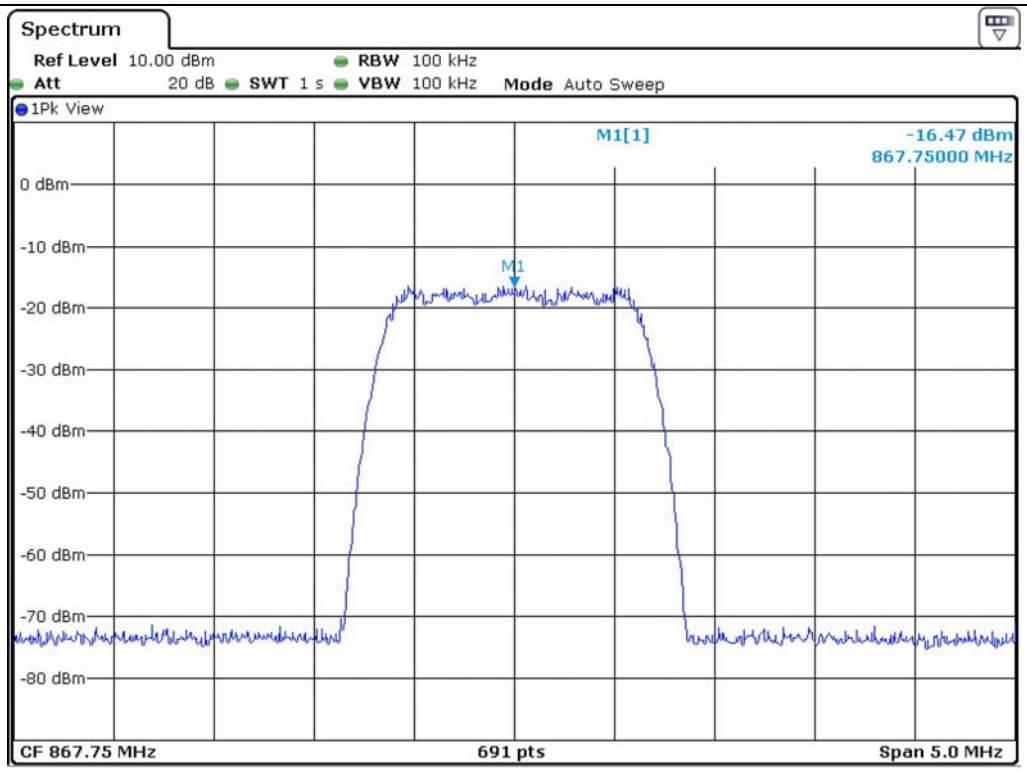


1xEVDO – Input (High Channel)

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

7. SPURIOUS EMISSION AT ANTENNA TERMINAL

7.1 Operating environment

Temperature : 21 °C

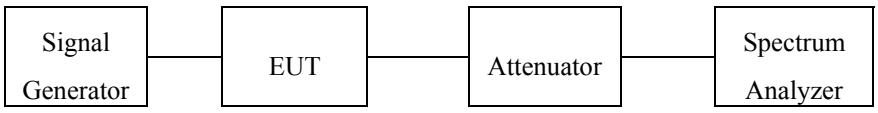
Relative humidity : 49 %R.H.

7.2 Test set-up for conducted measurement

The RF signal from the signal generator(s) was injected to the EUT by cable. The amplified RF signal at the output of the EUT was connected to the power meter or spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

The amplified RF signal at the output of the EUT was connected to the spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.

The resolution bandwidth and video bandwidth of the spectrum analyzer was set at 1 MHz and sufficient scans were taken to show any out of band emissions up to 10 GHz.



7.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	E4432B	HP	Signal Generator	US38440950	Jun. 01, 2012 (1Y)
■ -	SMJ100A	R/S	Signal Generator	101038	Feb. 01, 2012 (1Y)
☐ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 12, 2012 (1Y)
☐ -	8564E	HP	Spectrum Analyzer	3650A00756	Apr. 04, 2012 (1Y)
■ -	FSV30	R/S	Spectrum Analyzer	101372	May. 31, 2012 (1Y)
■ -	SA-26B-6	VENTRIX	Attenuator	N/A	Dec. 06, 2012 (1Y)

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

7.4 Test data

-. Test Date : January 09, 2013

-. Frequency range : 30 MHz ~ 10 GHz

-. Result : Pass

Modulation	Harmonic Frequency (MHz)		Measured Value (dBm)	Cable Loss (dB)	Total (dBm)	Limit (dBm)	Margin (dB)
CDMA	Low	690.70	-43.28	0.33	-42.95	-13.00	-29.95
		7 180.00	-23.21	2.50	-20.71		-7.71
	Middle	675.30	-43.41	0.33	-43.08		-30.08
		7 831.00	-23.91	2.50	-21.41		-8.41
	High	694.90	-43.60	0.33	-43.27		-30.27
		7 831.00	-22.94	2.50	-20.44		-7.44
1xEVDO	Low	697.70	-43.50	0.33	-43.17	-13.00	-30.17
		7 831.00	-22.16	2.50	-19.66		-6.66
	Middle	659.80	-43.26	0.33	-42.93		-29.93
		7 831.00	-23.52	2.50	-21.02		-8.02
	High	682.30	-43.59	0.33	-43.26		-30.26
		7 831.00	-23.34	2.50	-20.84		-7.84

According to Part 90I, out of band emission shall be attenuated by 43 + 10 log (P) dBc, equates to -13.0 dBm.

Tested by: Ki-Hong, Nam / Project Engineer

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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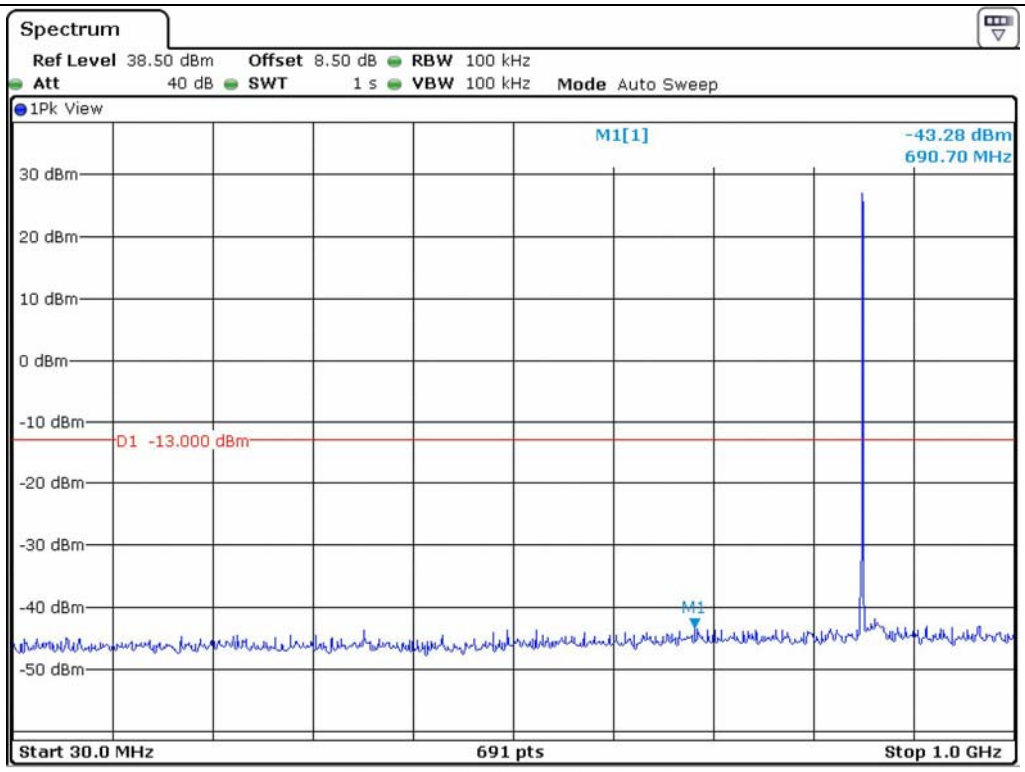
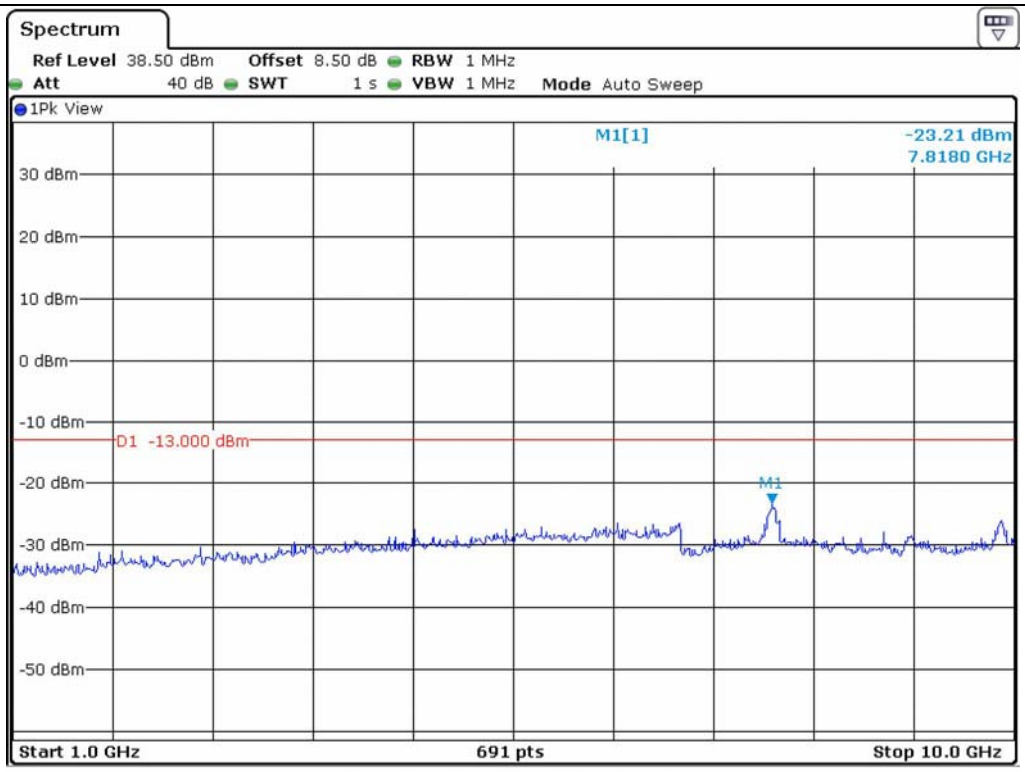


CDMA – Low Channel



CDMA – Low Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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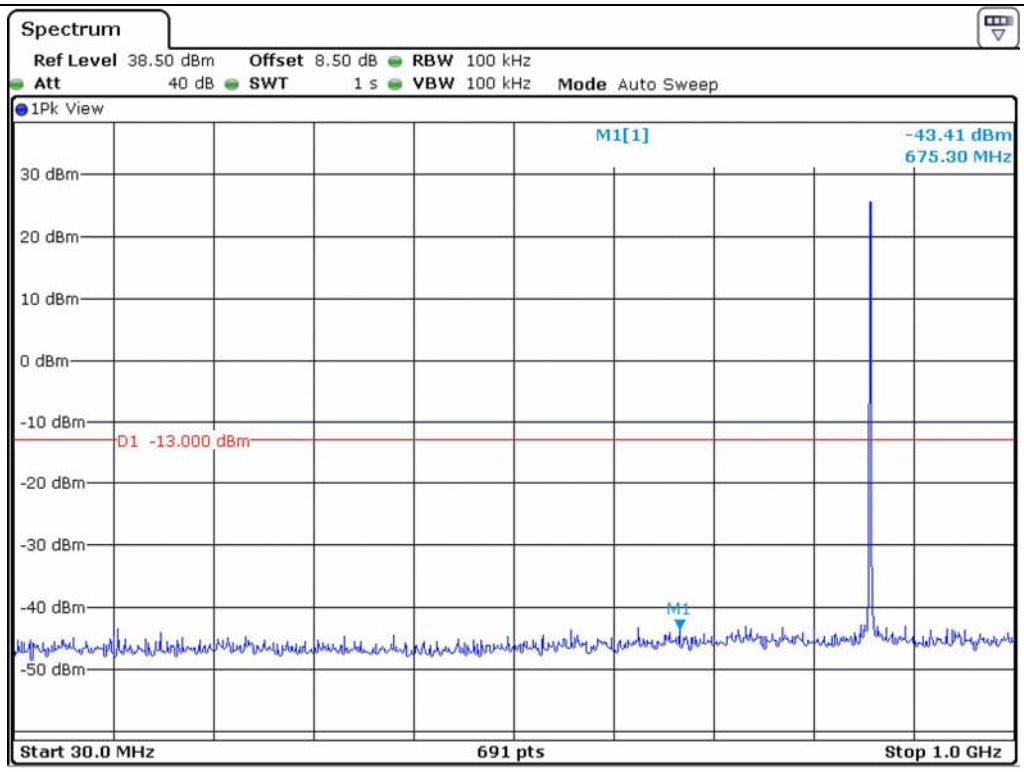
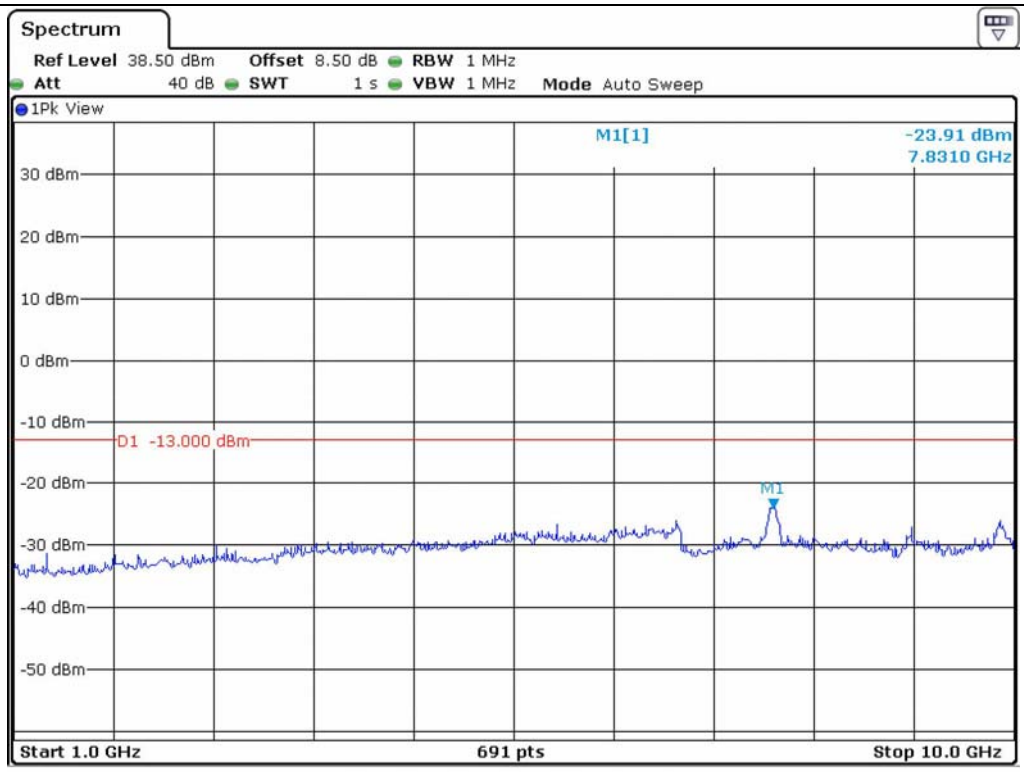


CDMA – Middle Channel



CDMA – Middle Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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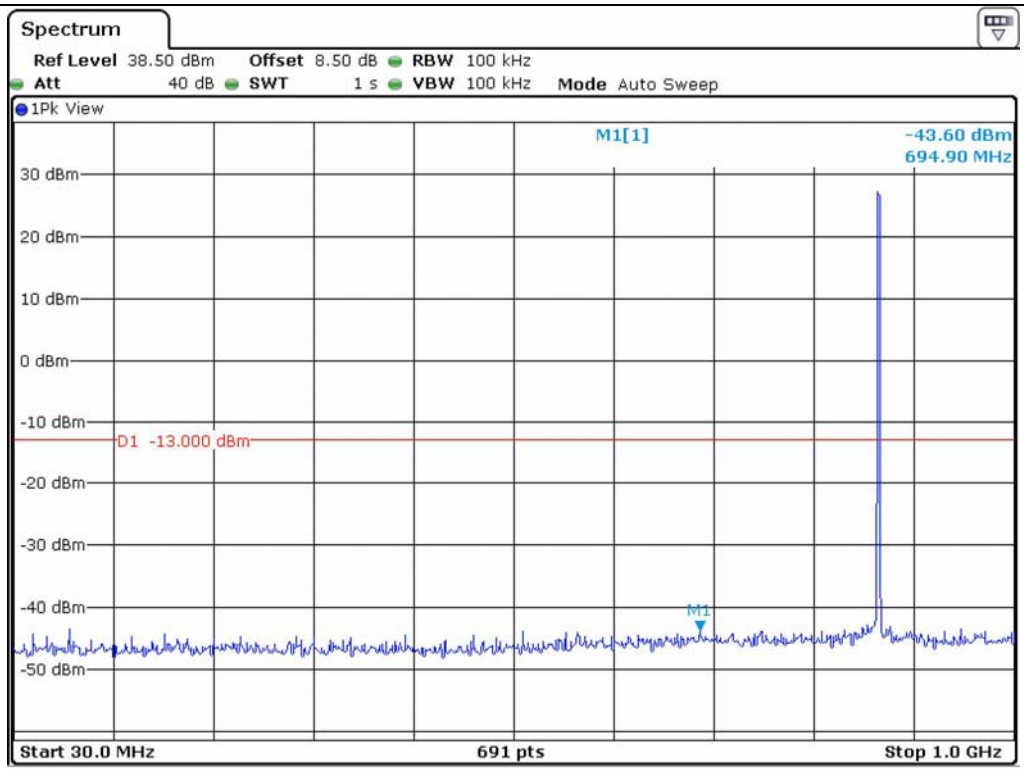
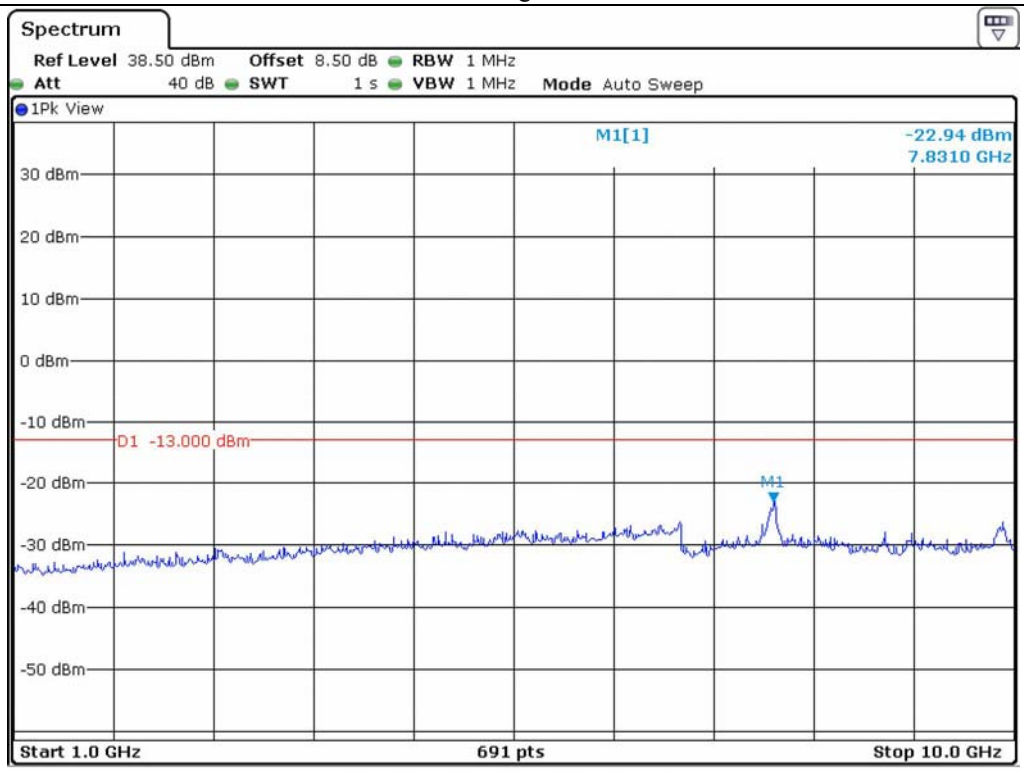


CDMA – High Channel



CDMA – High Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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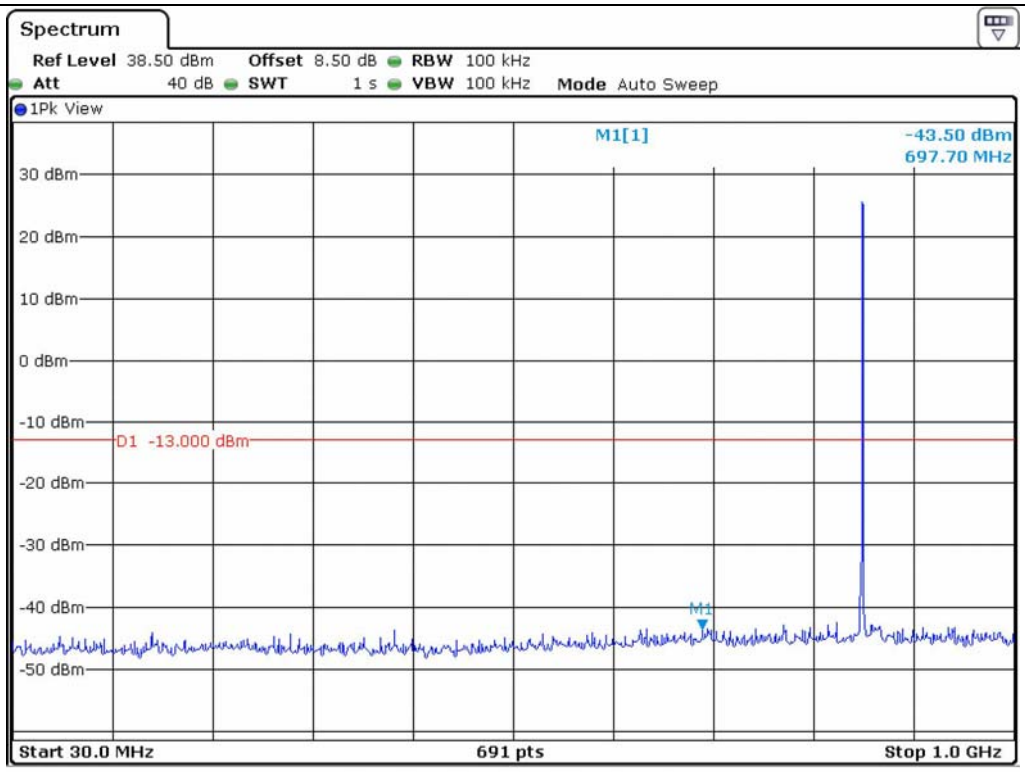
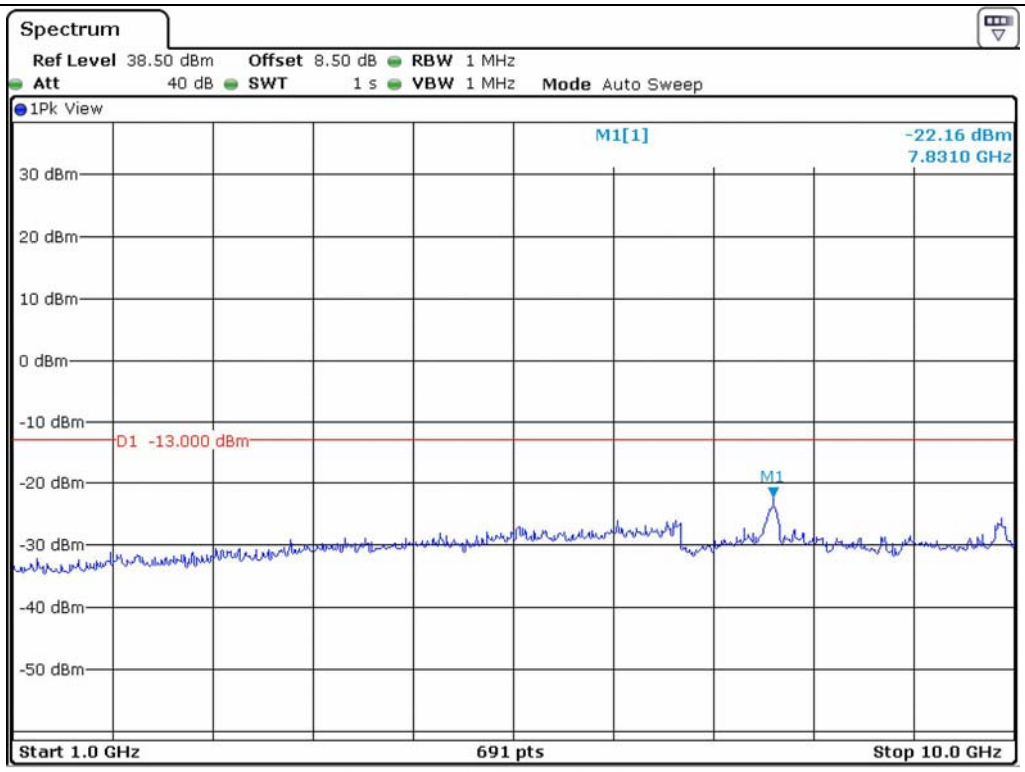


1xEVDO – Low Channel



1xEVDO – Low Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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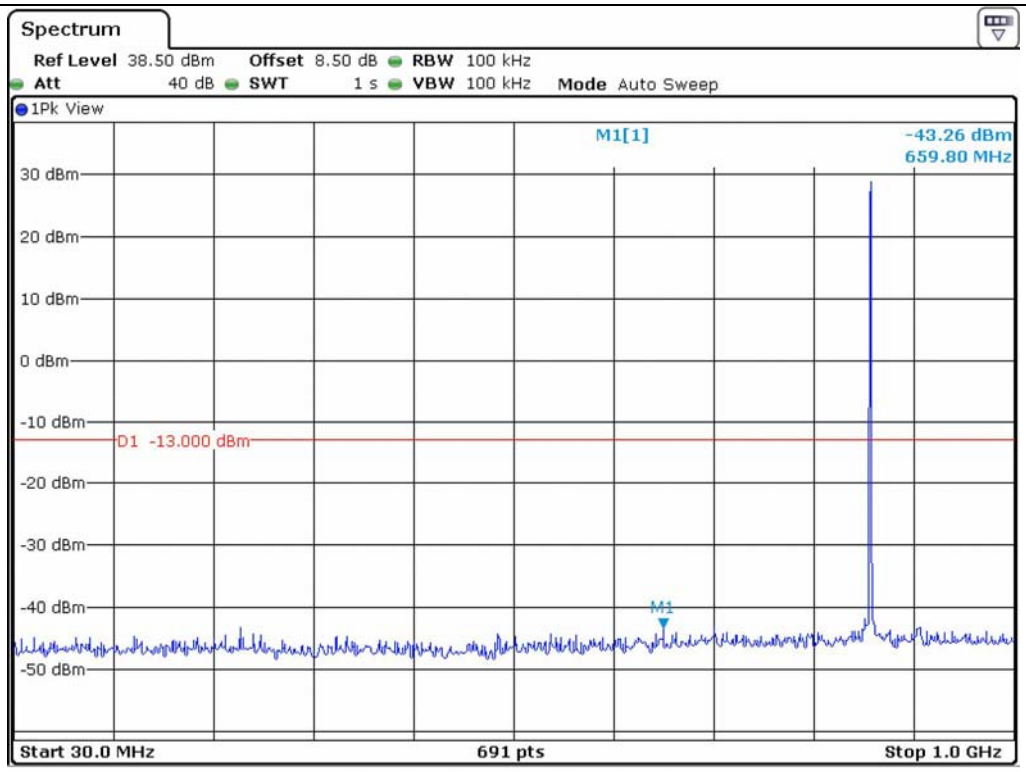
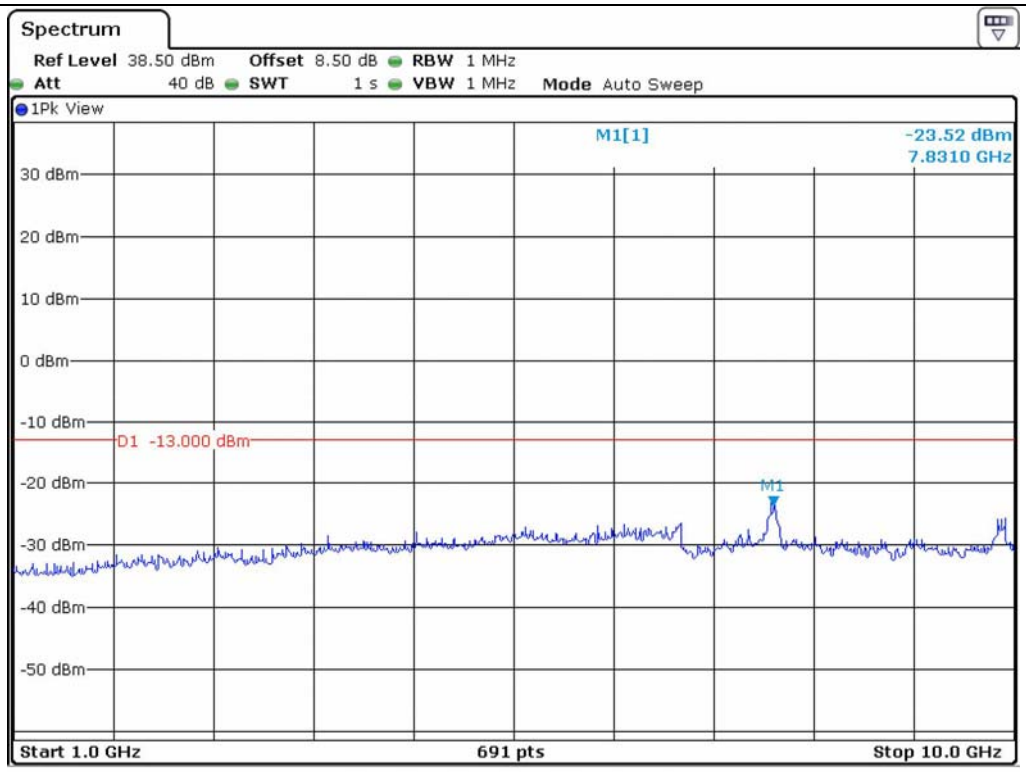


1xEVDO – Middle Channel



1xEVDO – Middle Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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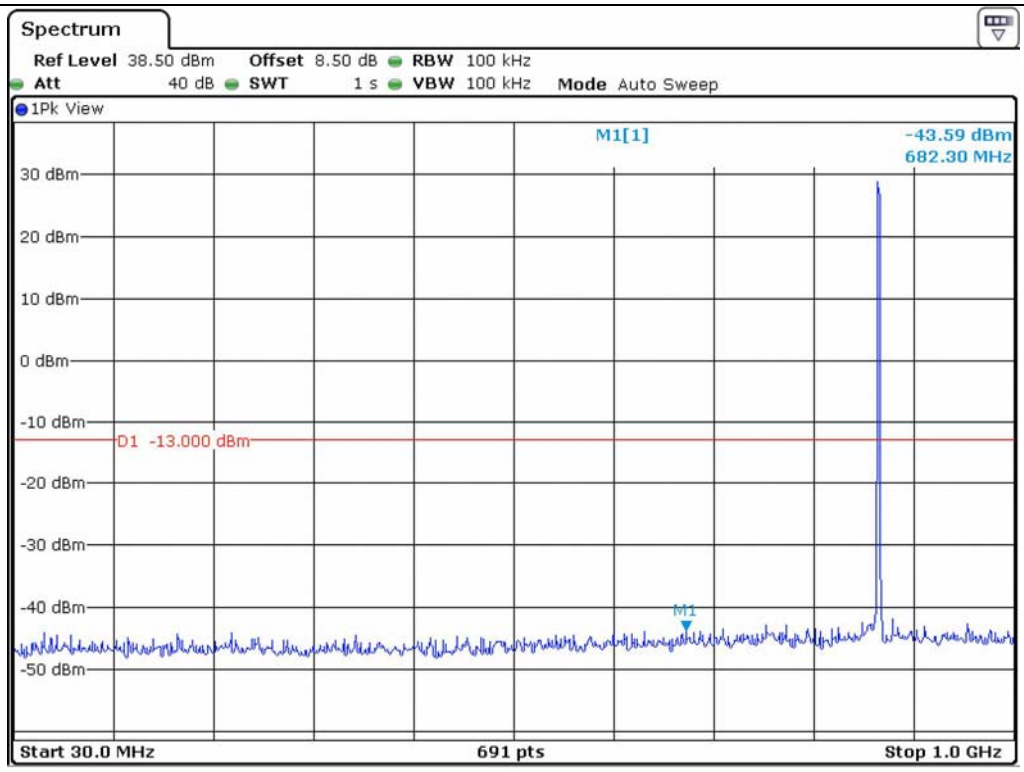
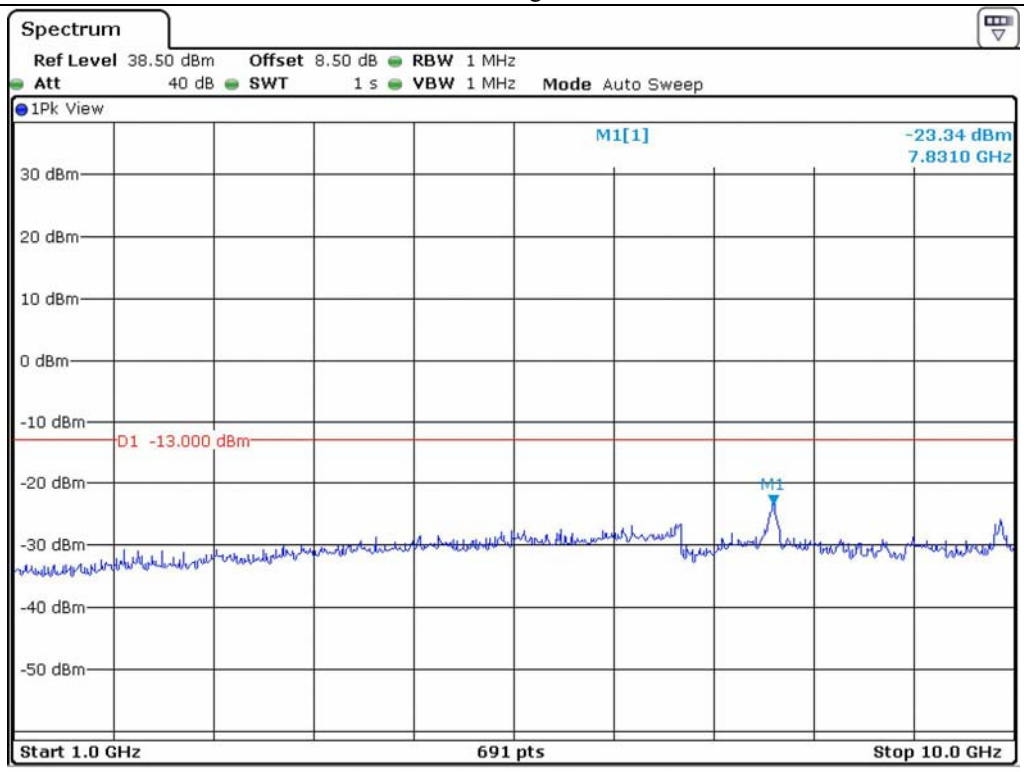


1xEVDO – High Channel



1xEVDO – High Channel

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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8. SPURIOUS EMISSION AT ANTENNA TERMINAL AT BLOCK EDGES ± 1 MHZ

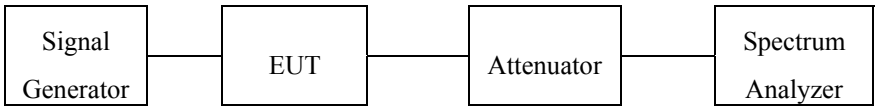
8.1 Operating environment

Temperature : 21 °C

Relative humidity : 49 %R.H.

8.2 Test set-up for conducted measurement

The RF signal from the signal generator(s) was injected the EUT by cable. The amplified RF signal at the output of the EUT was connected to the spectrum analyzer. The test was performed at three frequencies (low, middle, and high channels) at each band using all applicable modulation.



8.3 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■-	E4432B	HP	Signal Generator	US38440950	Jun. 01, 2012 (1Y)
■ -	SMJ100A	R/S	Signal Generator	101038	Feb. 01, 2012 (1Y)
■ -	FSP	R/S	Spectrum Analyzer	100017	Mar. 12, 2012 (1Y)
□ -	8564E	HP	Spectrum Analyzer	3650A00756	Apr. 04, 2012 (1Y)
■ -	FSV30	R/S	Spectrum Analyzer	101372	May. 31, 2012 (1Y)
■ -	SA-26B-6	VENTRIX	Attenuator	N/A	Dec. 06, 2012 (1Y)

All test equipment used is calibrated on a regular basis.

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)

8.4 Test data

-. Test Date : January 09, 2013

-. Result : Pass

Modulation	Channel	Measured Frequency (MHz)	Max. Measured Value (dBm)	Limit (dBm)	Margin (dB)
CDMA	Low	851.000	-36.15	-13.00	-23.15
	High	869.000	-31.49		-18.49
1xEVDO	Low	851.000	-36.51		-23.51
	High	869.000	-31.19		-18.19

According to Part 90I, out of band emission shall be attenuated by 43 + 10 log (P) dBc, equates to -13.0dBm.

Tested by: Ki-Hong, Nam / Project Engineer

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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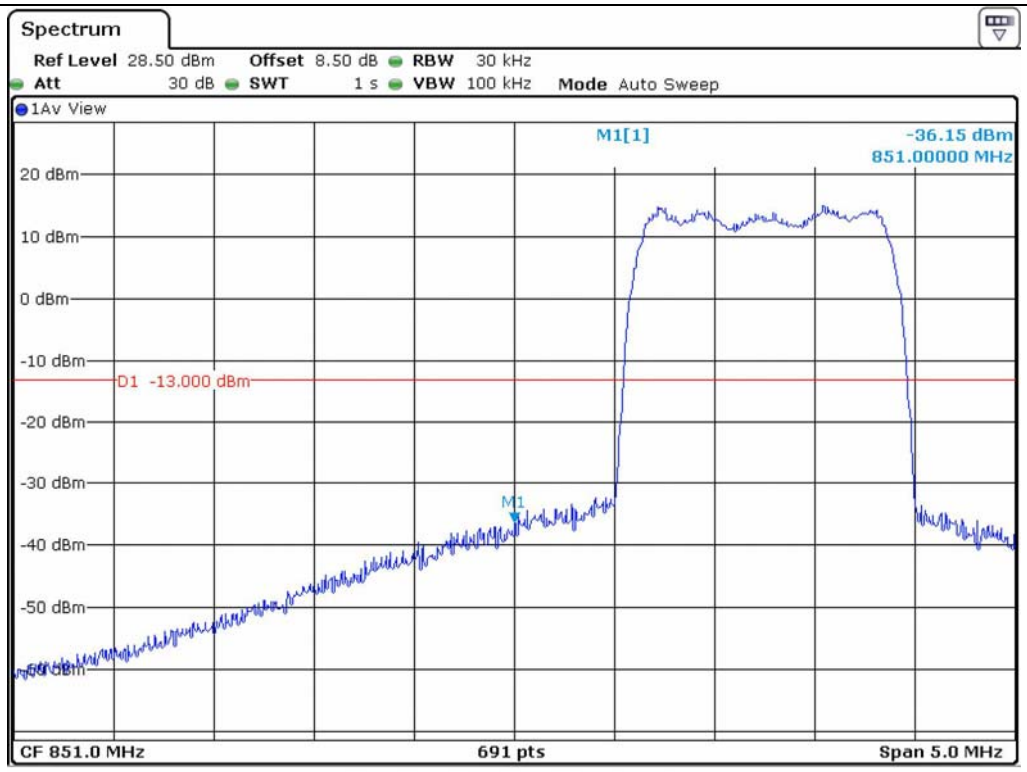
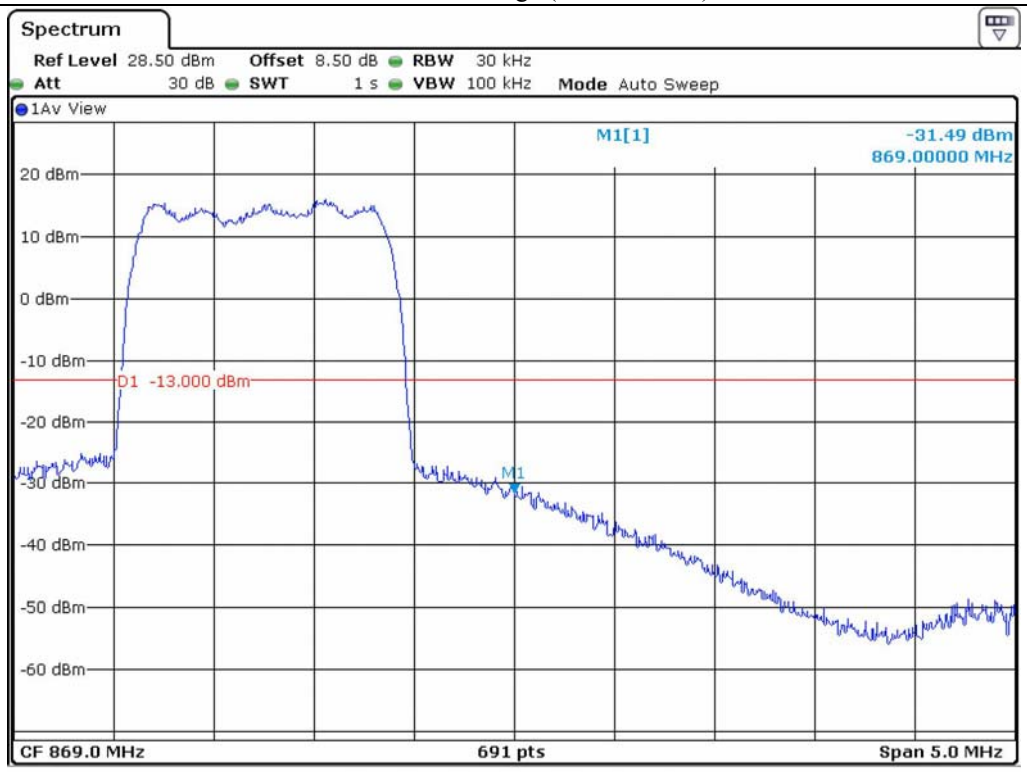
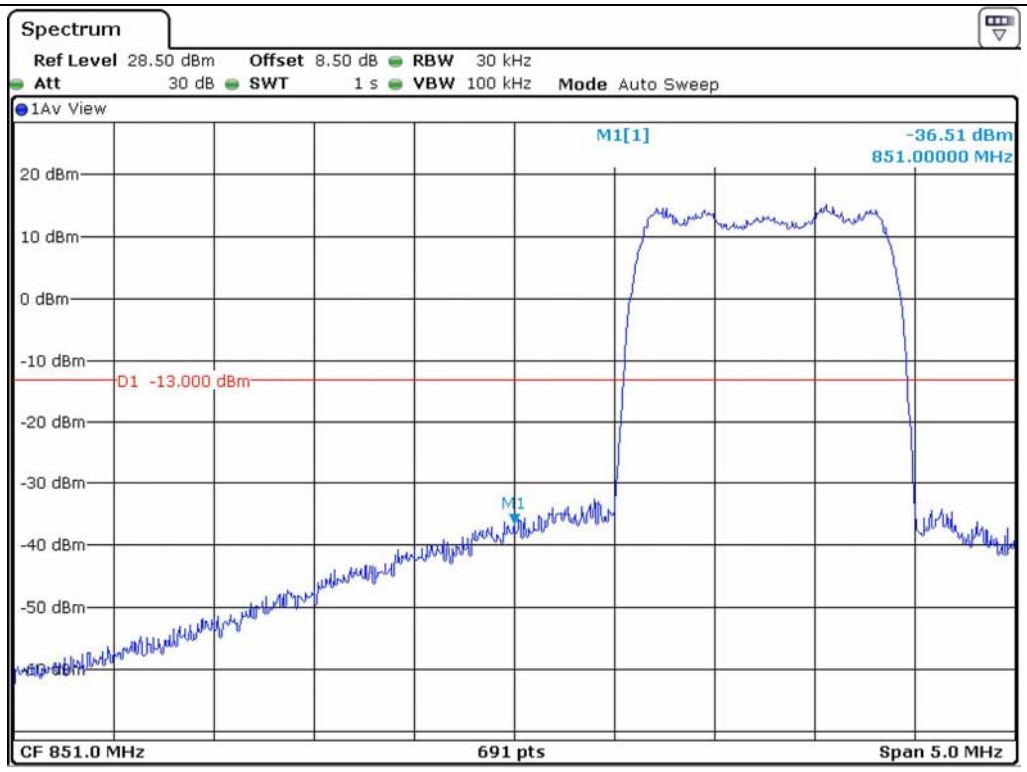


CDMA – Band Edge (Low Channel)

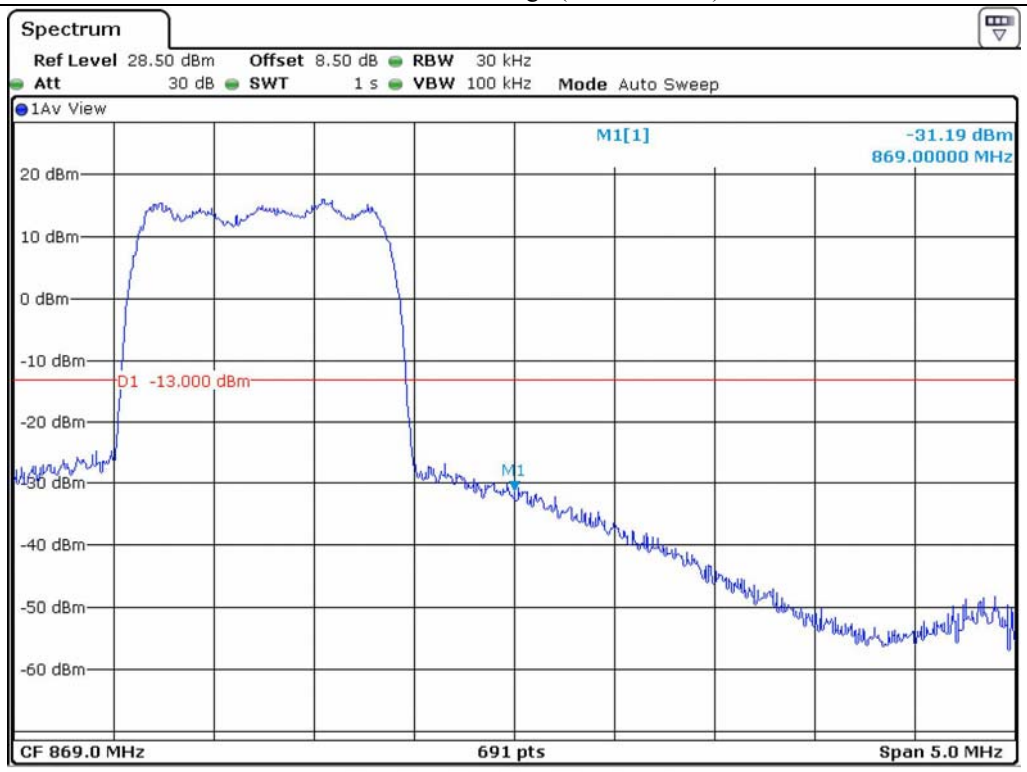


CDMA – Band Edge (High Channel)

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
EMC Testing Dept : 307-51 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-765-8289, FAX: 82-31-766-2904)



1xEVDO – Band Edge (Low Channel)



1xEVDO – Band Edge (High Channel)

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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9. MAXIMUM PERMISSIBLE EXPOSURE

9.1 RF Exposure Calculation

According to the FCC rule 1.1310 table 1B, the limit for the maximum permissible RF exposure for an uncontrolled environment is f/1500 mW/cm² for the frequency range between 300 MHz and 1500 MHz.

The electric field generated for a 1 mW/cm² exposure is calculated as follows:

$E = \sqrt{(30 * P * G)} / d$, and $S = E^2 / Z = E^2 / 377$, because 1 mW/cm² = 10 W/m²

Where

S = Power density in mW/cm², Z = Impedance of free space, 377 Ω

E = Electric filed strength in V/m, G = Numeric antenna gain, and d = distance in meter

Combing equations and rearranging the terms to express the distance as a function of the remaining variable

$d = \sqrt{(30 * P * G) / (377 * S)}$

Changing to units of mW and cm, using P (mW) = P (W) / 1 000, d (cm) = 100 * d (m)

$d = 0.282 * \sqrt{(P * G) / S}$

Where

d = distance in cm, P = Power in mW, G = Numeric antenna gain, and S = Power density in mW/cm²

9.2 Calculated MPE Safe Distance

According to above equation, the following result was obtained.

Peak Output Power		Antenna Gain		Safe Distance	Power Density (mW/cm²)	FCC Limit
(dBm)	(mW)	Log	Linear	(cm)	@ 20 cm Separation	(mW/cm²)
30.00	1 000	2.0	1.58	14.9	0.32	0.57

According to above table, safe distance, $D = 0.282 * \sqrt{1\,000 * 1.58 / 0.57} = 14.9$ cm.

For getting power density at 20 cm separation in above table, following formula was used.

$S = P * G / (4\pi * R^2) = 1\,000 * 1.58 / (4 * 3.14 * 20\text{^}2) = 0.32$

Where:

S = Power Density,

P = Power input to the external antenna (Output power from the EUT antenna port (dBm) – cable loss (dB)),

G = Gain of Transmit Antenna (linear gain), R = Distance from Transmitting Antenna

Note: End users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance, because the applicant does not provide an antenna for sale with the EUT.

HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)
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